

May 1954

E-879

United States Department of Agriculture
Agricultural Research Service
Entomology Research Branch

EXPERIMENTS ON HIBERNATION OF THE PINK BOLLWORM
IN TEXAS AND OKLAHOMA, 1952-53 1/

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During the winter of 1952-53 experiments on hibernation of the pink bollworm (Pectinophora gossypiella (Saund.)) were conducted at six localities in Texas and at one locality in Oklahoma. The purpose of these experiments was to obtain information on pink bollworm survival under different conditions, especially in areas where it had recently spread. In Texas the experiments were at Brownsville, Port Lavaca, Waco, Greenville, Lubbock, and Vernon, and in Oklahoma at Chickasha. Climatic conditions ranged from subtropical and humid at Brownsville to cold and arid at Lubbock.

Procedure

Eighty hibernation cages, each containing 3 pounds of infested open cotton bolls, were installed at each locality. These cages were divided into four groups of 20. In three groups the bolls were placed on the soil surface and buried either in the fall or spring or were not buried. In the fourth group the bolls were placed above the ground to simulate conditions on standing stalks and were buried in the spring.

In all burial treatments the bolls were placed about 2 inches below the surface. An estimate of the number of larvae at each locality was obtained by examining a sample of bolls at the time they were placed in the cages. The cages were equipped with moth traps in the spring, and daily records were made on moth emergence for computing the percentage of survival.

1/ This study was made in cooperation with the Texas Agricultural Experiment Station.

2/ The following persons assisted in obtaining the data presented in this paper: Ivan Shiller, C. R. Parencia, G. L. Smith, W. L. Lowry, and O. T. Robertson of the Entomology Research Branch, and F. M. Wilson and W. P. Senette of the Plant Pest Control Branch.

Owing to the wide variation in seasonal conditions in the different localities, the experiments were begun on different dates. The bolls were placed in the cages on September 1 at Brownsville, on October 10 at Port Lavaca, and on November 15 at the other localities. Those receiving fall burial were buried at the time they were placed in the cages. The spring burial dates were January 15 at Brownsville, February 1 at Port Lavaca, and March 1 at the other places.

Results

The pink bollworm survival for each treatment and the average for all treatments at each locality are recorded in table 1. The climatological data are summarized in table 2. Winter temperatures were slightly above normal.

Survival at the different localities varied widely, the average percentage ranging from 0.05 at Brownsville to 16.33 at Waco. At Brownsville a low carryover was expected owing to the early date, September 1, that the bolls were placed in the cages. Dry weather with high temperatures during the first part of September caused a high mortality of larvae in bolls on the soil surface. The dry weather was followed by heavy rainfall the latter part of September, and this together with mild temperatures throughout the fall and winter stimulated the emergence of moths before traps were installed or before cotton was available for propagation of the insect. At Port Lavaca similar conditions, but with slightly lower temperatures and greater rainfall, were also favorable for a high fall and winter emergence. At Lubbock the light rainfall in the spring was undoubtedly a factor in reducing survival. No satisfactory explanation can be given for the wide variation in survival at Waco and Greenville.

Of the four treatments, fall burial of the infested bolls caused the lowest survival at localities with mild temperatures and heavy rainfall--that is, at Brownsville, Port Lavaca, Waco, and Greenville. In the localities with colder winter temperatures--that is, at Lubbock, Vernon, and Chickasha--survival was lowest in bolls exposed above the ground, simulating conditions on standing stalks. At all localities fall burial decreased survival of bolls on the surface below that for spring burial. At all places except Brownsville survival was highest in bolls that remained on the soil surface throughout the experiments.

Table 1.--Pink bollworms surviving hibernation under various conditions in Texas and Oklahoma, 1952-53

Locality	:Number of:		Percent survival in bolls			
	:larvae	:	On soil surface		:On stalks :	
	:in each	:	:Buried	:Buried	:Not	:buried :
	:treatment:	:	in fall:	in spring:	buried	in spring :Average
Brownsville	10,800	0	0.04	0.01	0.15	0.05
Port Lavaca	6,870	.01	.42	2.54	1.31	1.07
Waco	5,676	1.09	22.15	25.16	16.91	16.33
Greenville	8,544	.71	4.18	16.20	2.25	5.83
Lubbock	3,998	.13	.23	2.35	.03	.68
Vernon	4,552	.48	2.44	8.13	.20	2.81
Chickasha	4,184	.72	9.70	15.97	.05	6.61

Table 2.--Climatological data for localities in which pink bollworm hibernation experiments were conducted, 1952-53

Locality	:Lowest	:Rainfall September 1 to June 30 (inches)	
	:winter	:	:
	:temperature	:	:Departure
	:(°F)	:Total	:from normal
Brownsville	38	11.44	-14.30
Port Lavaca	30	25.32	+0.33
Waco	21	28.52	+9.60
Greenville	19	30.91	+9.86
Lubbock	9	4.29	-5.25
Vernon	13	11.03	-5.33
Chickasha	9	15.56	-2.51



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